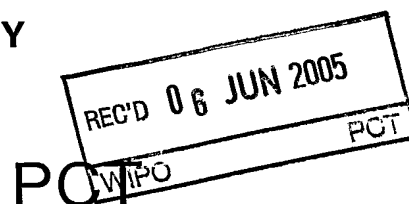


PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY



To:

see form PCT/ISA/220

21/1

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/ZA2005/000002

International filing date (day/month/year)
07.01.2005

Priority date (day/month/year)
07.01.2004

International Patent Classification (IPC) or both national classification and IPC
C22B3/04, C22B3/02

Applicant
DUNN, Grenvil, Marquis

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/ZA2005/000002

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/ZA2005/000002

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,8-11,20,23,24,26-29,33
	No: Claims	1,2,4-7,12-19,21,22,25,30-32
Inventive step (IS)	Yes: Claims	3,8-11,20,23,24,26-29,33
	No: Claims	1,2,4-7,12-19,21,22,25,30-32
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

see separate sheet

1. The application relates to a method of leach autoclave processing comprising the steps of flashing the autoclave, performing a solid-liquid separation of the flash underflow slurry and returning a portion of the thus obtained solid and aqueous fractions to the autoclave. Further embodiments of the method relate to the use of additional tanks and flow lines or to process parameters of the autoclave. A leach autoclave processing plant is also claimed (claim 30).

According to the description, the claimed method is a further development of the "flash and recycle" (FR) method as known from WO02/92862 (PCT/AU02/00584) and is subsequently called "flash-thicken recycle process" (FTR). Its main advantage is that the solids fraction retention time in the autoclave is increased significantly (p.7, 4th paragraph).

The embodiment of Figure 3, said to be an example of the FTR process of the invention, is described on page 9. The flash line is indicated as 72 and the system does not comprise a flash tank 20 as present in the embodiment of Figure 2. Consequently, the expression "flashing the autoclave and generating a flashed underflow" of claim 1 is to be interpreted very broadly and can also correspond to the exothermic steam release caused by the autoclave processing itself.

2. Reference is made to the following documents:

D1: US-A-5 071 477

D2: US-A-3 917 519

D3: US-A-4 578 163

D4: US-A-5 902 474

3. D1 discloses a process for recovery of gold from refractory ores using pressure oxidation in an autoclave 15. Noncondensables and steam generated during the pressure oxidation operation are vented through a cyclone 23 which separates entrained solids for return to the autoclave (col.6, l.12-15). The oxidized slurry is later submitted to flashing in flash tanks 17, 18 and 19 and ultimately used in a carbon in leach gold recovery process (Figure 1).

Through the broad interpretation of the process steps of claim 1 (see section 1., last paragraph above), the vented portion of noncondensables and steam is seen as a flashed underflow from the autoclave which is submitted to a solid-liquid separation (cyclone 23) and the solids fraction is returned to the autoclave. Through the use of a cyclone, it is considered that at least some of the aqueous fraction will be mixed with the solids fraction and thus also returned to the autoclave. This corresponds in particular to the feature of claim 2.

Consequently, the subject-matter of claims 1 and 2 as well as that of claims 4 to 7, 12, 18, 19, 21, 22, 25 as well as independent claim 30 is not new over the disclosure of D1 (Art.33(2) PCT).

4. The features of dependent claims 13 to 17 are related to an optimisation of the pressure oxidation process in the autoclave and are thus well-known to the skilled person for whom these features are obvious workshop modifications (Art.33(3) PCT).
5. D2 describes a method for making electrolytic copper whereby a chalcopyrite concentrate is slurried in a slurry tank, submitted to oxidation leaching and the resulting slurry is flashed to atmospheric pressure to remove heat. The slurry is then subjected to a solids-liquid separation such as filtration, centrifuging etc. and preferably with a thickener (col.4, lines 50-54). The solids are washed to recover retained copper sulphate solution which is then recycled to the autoclave and the liquid phase is ultimately recycled as a thickened copper sulphide slurry to the autoclave (claim 1).

D3 discloses a process for treating refractory ores using a pressure oxidation treatment. The autoclave comprises a plurality of agitated compartments. The oxidized slurry leaves the autoclave 62 to enter the flash tanks 50 and 48. The slurry discharged from the flash tanks is further processed in agitated tank 70 where it is mixed with recycled liquid 72 before it is forwarded to a thickener 74, preferably a gravity thickener. The overhead stream from the thickener 74 is directed back to pressure oxidation mix tanks 24 and 40 via an acid recycle line 78. The underflow from the thickener is subjected to a series of washing steps and ultimately used in a

cyanide leach for gold recovery (col.4, line 8 - col.5, line17 and Figures).

D4 describes a process for extracting precious metals from a copper sulphide ore using pressure oxidation followed by flashing and a solid-liquid separation. 95% of the liquid phase from the solid-liquid separation is recycled into the pressure oxidation step whereas the solids are submitted to atmospheric leach and further process steps (Figure 1).

In the processes of D2, D3 and D4, the oxidized autoclave slurry is flashed, then submitted to a solid-liquid separation and at least a portion of the aqueous fraction is returned to the autoclave. The solids fraction is not returned to the autoclave but submitted to further treatments either for waste disposal (D2, D4) or for further extraction (D3).

Consequently, the processes of D2, D3 and D4 are not novelty destroying to the subject matter of claim 1 and thus also not to that of the dependent claims 2 to 29.

6. With regard to the apparatus claim 30, the disclosure of at least D2 (see Figure) is however relevant as it describes an autoclave feed tank ("slurry tank"), an autoclave ("oxidation leaching"), means to flash the autoclave to generate a feed underflow ("flashing") and separation means for solid-liquid separation ("solids-liquid separation"). "Means to return at least the solids fraction to the autoclave" as claimed in present claim 30 is present in the form of line 16 plus line 2.

Consequently, the apparatus claim 30 and the dependent claims 31 and 32 does not fulfill the requirements of Art.33(2) PCT in view of D2.

7. The addition of the cyclone treatment of the vented/flashed portion from the first compartment of the autoclave of D1 to any of the processes of D2, D3 or D4 does not lead to the process of present claim 1 as such a modification implies two solid-liquid separations, one for mainly recycling the solids to the autoclave (D1) and one for the recycling of the aqueous fraction (D2, D3, D4).

The requirement of inventive step of Art.33(3) PCT is therefore fulfilled for the claims

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AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/ZA2005/000002

whose novelty and inventive step is not contested by either D1 or D2.